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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,922	11/30/2001	Stephen H. Foulger	CXU-343	5372
22827	7590	08/24/2004	EXAMINER	
DORITY & MANNING, P.A. POST OFFICE BOX 1449 GREENVILLE, SC 29602-1449			KUGEL, TIMOTHY J	
			ART UNIT	PAPER NUMBER

1712

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/998,922	<b>Applicant(s)</b> FOULGER ET AL.	
	<b>Examiner</b> Timothy J. Kugel	<b>Art Unit</b> 1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-15, 17-22 and 24-27 is/are rejected.
- 7) ☒ Claim(s) 7, 16 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/30/2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

2. A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

3. The use of the trademarks NALGENE, BLAK-RAY, SHIMADZU, and MACBETH have been noted in this application. They should be capitalized wherever they appear and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 8-15, 17-22, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asher (6,753,191) in light of Santini (6,123,861).

6. Pertaining specifically to claims 1-6, and 8-15 and 17-18 Asher discloses a polymerized crystalline colloidal array (Col. 3 Lines 30-33), produced from electrically charged particles (Col. 8 Lines 33-35) – specifically disclosing the use of polystyrene-based colloidal particles (Col. 7 Line 66 – Col. 8 Line 6) – using a crosslinking agent polymerized with the polymeric matrix (Col. 8 Lines 14-20 and Lines 44-48) and disclosing that the polymerized crystalline colloidal array exhibits a visible photonic bandgap that is capable of shifting upon environmental stimulation (Col. 1 Lines 25-35 and 54-60). Asher does not speak to encapsulating the polymerized crystalline colloidal array specifically in a polymeric matrix of polymerized poly(ethylene glycol) methacrylate to make the composition biologically compatible. Santini teaches the use of poly(ethylene glycol) like materials, including copolymers with methacrylate functionality, to encapsulate non-biocompatible materials for in biological applications (Col. 4 Lines 44-46 and Col.5 Lines 49-63). It would be obvious to one of ordinary skill in the art to combine the teachings of Asher and Santini and encapsulate the polymerized crystalline colloidal array in a polymeric matrix comprising polymerized poly(ethylene glycol) methacrylate, since Santini teaches that such polymers are preferred for biological compatibility and for controlled particle release.

7. Pertaining specifically to claims 19-22, and 27 Asher discloses a sensor comprising a crystalline colloidal array encapsulated in a polymer matrix, incorporating a

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crosslinking agent, defining a visible bandgap at a first wavelength, wherein upon chemical stimulation of said sensor said visible bandgap is capable of shifting to a second wavelength (Col. 1 Lines 25-35 and 47-60), but does not speak to encapsulating the sensor in a polymeric matrix of polymerized poly(ethylene glycol) methacrylate to make the composition biologically compatible. Santini teaches the use of poly(ethylene glycol) like materials, including copolymers with methacrylate functionality, to encapsulate non-biocompatible materials for in biological applications (Col. 4 Lines 44-46 and Col.5 Lines 49-63). It would be obvious to one of ordinary skill in the art, wishing to make a sensor comprising a crystalline colloidal array encapsulated in a polymer matrix defining a visible bandgap at a first wavelength, wherein upon stimulation of said sensor said visible bandgap is capable of shifting to a second wavelength for use in biological applications, to combine the teachings of Asher and Santini and encapsulate the polymerized crystalline colloidal array in a polymeric matrix comprising polymerized poly(ethylene glycol) based monomer units.

8. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asher ('191) in light of Santini ('861) as applied to claims 1-6, 8-15, 17-22, and 27 above, and further in view of Asher (6,165,389) or Asher (6,123,845).

Asher ('191) and Santini ('861) combine to teach a sensory device comprised of a poly(ethylene glycol) methacrylate based polymer matrix encapsulating a crystalline colloidal array defining a visible bandgap at a first wavelength wherein stimulation of sensory device causes the bandgap to shift to a second wavelength, but fail to disclose that mechanical, thermal, or electrical stimulation will affect said wavelength shift.

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Asher ('389) claims a crystalline colloidal array that will undergo a volume phase transition, and therefore a bandgap wavelength shift, in response to temperature changes (Col. 13 Line 60 – Col. 14 Line 3). Additionally, Asher ('389) teaches that pressure changes would be detected by changes to the color diffracted by the array (Col. 12 Lines 20-29). Asher ('845) teaches that an electrical field can be employed to move the particles of such a device to substantially obstruct or nonobstruct the interstices of the lattice, therefore affecting the wavelength of the diffracted light. It would be obvious to one of ordinary skill in the art, that shifting from one visible bandgap wavelength to another under chemical, thermal, mechanical, or electrical stimulation is an inherent property of a sensor comprising a crystalline colloidal array encapsulated in a poly(ethylene glycol) methacrylate based polymer matrix.

### ***Allowable Subject Matter***

9. Claims 7, 16 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

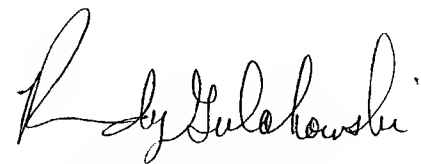
2002/0164823	11/2002	Asher et al.
6187599	2/2001	Asher et al.
6339030	1/2002	Constant et al.
6444254	9/2002	Chilkoti et al.
6554800	4/2003	Asher
6632922	10/2003	Deming et al.
5845078	12/1998	Asher et al.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Kugel whose telephone number is (571) 272-1460. The examiner can normally be reached on 7:00 AM - 4:00 PM Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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